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Oat Production in Minnesota

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Minnesota leads the nation in oat acreage. The $90-million crop is grown on nearly 3 million acres. Acreage declined from 1950 to 1962, increased in 1963, and has been decreasing slowly since 1963. The average yield has increased from 34 bushels per acre during 1935-39 to about 50 bushels per acre during the past 5 years: 1963-67 (table 1).

The oat crop is very versatile. It is widely used as a companion crop in establishing grass and legume seedlings. Much of the crop is used for livestock feed. About two-thirds of the crop is fed on farms where it was produced. Oats may be used for silage or hay. When fed in these forms, nearly twice as much T. D. N. per acre is realized as compared to feeding only the grain. Oat straw is a high quality bedding for livestock.

A portion of the grain is milled and used for human foods, such as breakfast cereals. Desirable characteristics of grain used for milling are: freedom from mixtures with other crops, high test weight, plump kernels, low percentage of hulls, freedom from foreign materials, low amount of hulled kernels, and high protein content.

Oats are produced on many soil types and under most of Minnesota's varied climatic conditions. Many growers commonly produce 90 to 100 bushels of grain per acre--indicating that large numbers of growers could increase their yields and profits substantially with proper care of the crop. As with any other crop, production efficiency depends on the use of sound production techniques.

Table 1. Acreage and yield of oats in Minnesota

Year	Acreage Harvested	Yield (Bushels per acre)
1925-29	4,394,200	33
1930-34	4,271,400	28
1935-39	4,187,400	34
1940-44	4,283,200	35
1945-49	5,014,800	39
1950-54	5,125,000	37
1955-59	4,127,600	42
1960-64	3,365,400	47.6
1965	3,004,000	55
1966	2,974,000	46.5
1967	2,885,000	54.5

Seedbed Preparation

Disking and harrowing the land prior to seeding is a common method of seedbed preparation. Plowing may produce higher yields than disking, but it is slower and more costly. Fall preparation is desirable because it enables many soils to dry and warm up faster in the spring, thus allowing earlier seeding. If oats follow corn in crop rotation, cornstalks should be chopped before seedbed preparation to facilitate incorporation of the stalks.

Time, Method and Rate of Seeding

Seed as early in the spring as the soil can be worked without undue soil compaction. Early seeding allows flowers to pollinate and kernels to form before the hottest part of the summer. If seeding is delayed, earlier than normal varieties should be used.

A grain drill is the best machine for seeding oats because it distributes seed evenly at a uniform depth. Broadcasting wastes seed and often results in uneven stands. Seed in moist soil at a depth of 1 to 2 inches. Deeper placement may result in poor stands and poor root formation. If forage crops are seeded with oats, grass and legume seeds should be covered by soil but should not be placed more than 1/2-inch deep. Compaction of soil over the rows with presswheels will result in more even stands than if no packing is done.

Seed at 64 to 80 pounds (2 to 2 1/2 bushels) per acre if drilled. With broadcast seeding, higher rates (up to 3 bushels) may be needed.

Varieties

Choosing a variety is one of the most important decisions you will make in producing a good crop of oats. The available varieties differ markedly in yielding ability, maturity, standing ability, hull percentage, test weight, and disease resistance. Generally, the later maturing varieties produce the highest yield, but some of the earlier varieties are also good yielders. Study available performance data before choosing a variety.

If oats are used as a companion crop, a compromise between highest oat yields and good stands of grasses and legumes is necessary. Since the oat crop competes with grass and legume seedlings, a too-vigorous, late-maturing oat crop may result in a poor stand of weak forage plants.

An early maturing, lodging-resistant variety is best for a companion crop. The two most important oat diseases are crown (leaf) and stem rust. All available varieties are susceptible to race 6AF of stem rust, currently the most prevalent in Minnesota. Some have resistance to other races found in the state. No varieties are completely resistant to crown rust, but a few have a moderate degree of resistance. Rust races continually change so varieties which are resistant when introduced may become susceptible in a few years.

Descriptions and performance data for many varieties are found in Minnesota Agricultural Experiment Station Miscellaneous Report 24. This publication is revised annually and should be consulted when choosing a variety.

Seed Quality

Varietal purity is important in obtaining the benefits of improved varieties. Certified seed provides the best assurance of varietal purity and is good for other quality factors. Good seed is high in germination and free from weed seeds, other crop seeds, and inert material. The seed tag provides this information - read it carefully. High-quality seed costs a little more but it is a good investment. Seed represents only a small part (5 to 10 percent) of total production costs.

Seed Treatment

Always treat the seed with a recommended chemical. This prevents infection by smuts, seedling diseases, and other seedborne fungi. Seed treatment provides inexpensive insurance against these diseases, and is especially important if the variety used is not completely resistant to smut.

Weed Control

A good stand of vigorous oat plants will go far in keeping weeds under control. Early seeding of high-quality seed in a good seedbed with good soil fertility will help get oats off to a good start. Chemicals provide valuable supplemental control.

All chemical rates given are acid equivalent or active ingredient. Read the label to determine the rate of product to apply.

The Chemicals 2, 4-D amine and MCPA will control most broadleaved weeds. Oats are more tolerant to MCPA than to 2, 4-D, so MCPA is preferable for this crop. Up to 1/2 pound per acre of one of these chemicals may be used. If legumes were underseeded, the rate of these chemicals should not exceed 1/4 pound per acre and even at this rate, some legume injury may occur. MCPA may be applied from two-leaf to early boot stage of the oats, while 2, 4-D should be applied only from the six-leaf to early boot stage. If 2, 4-D is used, do not graze treated fields for two weeks after treatment and do not use straw for livestock feed.

For controlling hard-to-kill weeds, such as wild buckwheat and smartweed, dicamba (Banvel-D) may be applied when oats are in the two-to-five-leaf stage. Rates used should be 1/8 pound dicamba per acre alone or with 1/4 pound MCPA. The mixture is preferred if mustard is a problem because dicamba does not control this weed well.

Caution - Neither dicamba nor the mixture should be used if the oats were underseeded with a legume. Do not graze or feed oat forage or threshings treated with dicamba to livestock.

If oats are underseeded with a legume, 2, 4-DB (Butyrac or Butoxone) may be applied to the oats at 1/2 to 1 1/2 pounds per acre when the grain is 6 to 8 inches tall. This chemical will not damage legumes except sweetclover. Mustard is usually not controlled and other broadleaved weeds require higher rates than those used for MCPA and 2, 4-D. Caution: Grain should not be harvested for 30 days after treatment with 2, 4-DB.

Further information on weed control can be found in Minnesota Agricultural Extension Folder 212. Follow instructions on the container label.

Fertilization

Oats readily respond to fertilizer. However, because of the price received for the crop there is a need to be more conservative with fertilizer rates on oats than with most crops.

Phosphorus and potassium are most efficiently used if applied with the fertilizer attachment on a grain drill. Nitrogen, too, can be applied this way in most instances, unless high rates are to be used or if unusually dry conditions prevail at seeding time. If there is no fertilizer attachment on the drill, rates of mixed fertilizer should be increased by 50 to 100percent. Broadcast material must be incorporated before or while preparing the seedbed. Surface applications of phosphorus and potassium after tillage and seeding is completed generally have been unsatisfactory. Nitrogen, however, will move into the soil and can be topdressed satisfactorily if rainfall is adequate.

A soil test should be taken in order to determine most adequately the rates and grades of fertilizer needed. If time does not permit testing, the following is recommended: In extreme western Minnesota, apply approximately 150 pounds per acre of 20-20-0 or similar grade in the row. This is a total of 30+ 30+0. In other areas of the state use a total of 45+ 30+15. This can be applied broadcast with blended materials or with 100 pounds per acre or 8-32-16 or a similar grade in the row, plus 35 pounds of elemental nitrogen topdressed or added preplant. The combined rate of nitrogen and potash in the row should not exceed 35 to 40 pounds per acre or germination might be affected. If lodging is generally a problem, apply less nitrogen.

Remember, if alfalfa or other legumes are to be seeded with oats, fertilizer rates must be made to suit the legume as well. Oats and legumes do not have similar fertilizer needs.

Harvest and Storage

For high-quality grain, oats should be harvested when mature and threshed as soon as the grain is dry enough to store safely. For long-term storage, kernel moisture content should be 13 percent or less. Grain can be stored for a few weeks at higher moisture content, but if too moist it will heat and mold in storage.

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